

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

In the outstanding Official Action, the specification was objected to for informalities; Claims 14, 15, 21-24, 36 and 37 were objected to for informalities; Claims 21, 24 and 25 were rejected under 35 U.S.C. § 112, second paragraph; Claims 13, 14, 25, 26, 27, 31-33 and 37 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,445,902 to Hirst et al.; and Claims 24, 28-30 and 34-36 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Hirst et al. in view of Yamamoto; and Claims 15-20, 22 and 23 were objected to as being dependent upon a rejected base claim but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims; and Claim 21 was indicated as allowable if rewritten to overcome the rejections under 35 U.S.C. § 112, second paragraph.

First, Applicants wish to thank Examiner Tran for the December 20, 2004 interview at which time Applicant's presented arguments to distinguish the present invention over the prior art. Specifically, Applicants explained that one embodiment of the present invention is that the image forming apparatus includes a start up mode, a print mode and an energy saving mode, wherein the start up mode is distinct from that of a prior art. More specifically, in the start up mode, a consumption of power in components other than the fixing section 30 is maintained low. Thus, an allocation of the power to the fixing section 30 is increased, resulting in a short start up time (see page 21 of the specification). As described referring to Figure 5 in the specification, when the energy saving mode is released and the image forming apparatus is put into the start up mode, power is directly supplied to the fixing section 30 but at the same time, auxiliary power is supplied to the fixing section 30 from the auxiliary power source 24 of the energy saving power supply section 21 at step S303 (page 13).

For example, when a maximum input power of the image forming apparatus is 1500W, a maximum pulse width is previously set such that the fixing section 30 consumes 900W of power except for 600W of power consumed by the DC power source 5, energy saving control section 6, and main body control section 17 (page 16).

The comparator 50 detects the reload of the fixing roller, namely whether or not the fixing roller 31 is heated to a temperature capable of performing a fixing operation. When the energy saving control section 6 detects the reload, the energy saving control section 6 activates the main power supply source 23 to supply the main body control section 7 with the low-voltage power at step S309. When the main body control section 7 is activated at step S310, the image forming apparatus completes the start up mode and proceeds the print mode at step S400.

While no agreement was reached, Examiner Tran explained that he would consider these points and the amendments and arguments of this response when formally filed.

Applicants wish to thank Examiner Tran for the indication of allowable subject matter in Claims 15-23. Applicants have amended Claim 21 to correct the informalities noted in the outstanding Official Action. However, Applicants wish to maintain Claims 15-23 in dependent form at this time, since Applicants believe that Claim 13 from which these claims depend, patentably defines over the cited references as amended herein.

With regard to the rejection under 35 U.S.C. § 112, second paragraph, Applicants have now amended Claims 21, 24 and 25 to correct the informalities noted in the outstanding Official Action. Therefore the rejection under 35 U.S.C. § 112, second paragraph is believed to be overcome and no further objection on this basis is anticipated. If, however, the Examiner disagrees, the Examiner is invited to telephone the undersigned who will be happy to work with the Examiner in an effort to derive mutually satisfactory claim language.

With regard to the objections to the specification and claims, Applicants have now amended the specification and claims to correct the informalities noted in the outstanding Official Action. Therefore the objection to the specification and claims is believed to be overcome.

Turning now to the merits, Applicants' invention is directed to an image forming apparatus in which a startup time of a fixing device is shortened. As described in the background section of Applicants' specification, in recent years, demand for energy savings is increasing in an image forming apparatus. Thus, attempts have been made to save energy. For example, energization of a fixing device is cut off in a standby state, or the fixing device is maintained at a temperature lower than a fixing temperature in the standby state. The present inventors have recognized that in such an image forming apparatus having an energy saving function, a quick startup is required when an image forming operation is performed. However the prior art does not address this need. Applicants' invention is directed to addressing this need.

Specifically, Applicants' Claim 13 as amended herein recites an image forming apparatus including a power supply configured to provide operating power for the image forming apparatus, and a fixing device having a heat source and configured to fix a developer image on a transfer sheet by heating the transfer sheet. Also recited is a fixing device control section configured to allocate a first level of the operating power to the heat source in an initial startup mode to rapidly heat the heat source to an operating temperature capable of a fixing operation, and to allocate a second level of the operating power lower than the first level but sufficient to maintain the heat source at the operating temperature in a non-startup mode. Thus, Applicants' Claim 13 has been amended to clarify that the first level of operating power provides rapid heating of the heat source to an operating temperature, and the second level of operating power is lower than the first level but sufficient to maintain the

heat source at the operating temperature. Independent Claims 26 and 32 have been similarly amended in means-plus-function and method format.

Applicants submit that the amended feature in independent Claims 13, 26 and 32 is fully supported by the specification as originally filed and therefore does not raise an issue of new matter. For example, Figure 3 of Applicants' specification is a flow chart illustrating an overall process performed in the image forming apparatus. As described in Figure 3 and the text relating thereto, the energy saving mode step S200 corresponds to a conventional standby mode, while step S300 corresponds to a startup mode in accordance with the present invention. As described in Figure 5 and the text associated therewith, when the standby mode is released and the startup mode begins, the fixing roller is rapidly heated to a "reload state" (i.e. an operating temperature) using a first level of power in steps 304 and 305. Once the reload state is reached, power is restricted to a level necessary to maintain the fixing device at its operating temperature as seen in step 306. Thus, the first and second power levels in Applicants' claimed invention relate to different power levels associated with a startup state, and not to a standby state.

In contrast, the cited reference to Hirst includes only the conventional standby state and single level operating state. Specifically, column 4 of Hirst et al. explains that a power control circuit 250 controls the application of power to the fusing system 202. In the standby mode, power is supplied at a reduced level to the fuser roller and pressure roller by the power control circuit 250 to reduce power consumption, lower the temperature, and reduce the degradation resulting from the continued exposure to the components of the fusing system to the fusing temperatures. From the standby temperature, the fuser roller 236 and the pressure roller 238 can be quickly heated to the temperature necessary to fuse toner to the recording media.

Thus, Hirst et al. explains that the reduced level of power to the fuser roller is associated with a standby mode wherein the fuser roller and pressure roller are maintained at a temperature lower than a fixing or operating temperature of these rollers. When the image forming device of Hirst et al. is released from the standby state, then the level of power is increased in order to bring the fuser roller and pressure roller to a temperature necessary for operation, and to maintain these rollers at such operating temperature. However, there is no discussion in Hirst et al. of first rapidly heating a heat source to bring the device into an operating condition in a very short time, and then reducing the power level to simply maintain the device in an operating condition. That is, Hirst et al. does not disclose “allocating a first level of the operating power to the heat source in an initial startup mode to rapidly heat the heat source to an operating temperature capable of a fixing operation, and allocating a separate level of the operating power lower than the first level but sufficient to maintain the heat source at the operating temperature in a non-startup mode” as now claimed in independent Claims 13, 26 and 32.

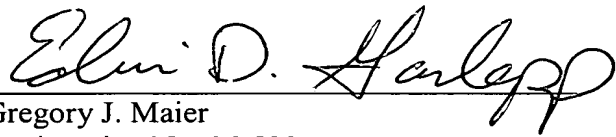
With regard to the cited secondary reference to Yamamoto, Applicants note that this reference is cited for its disclosure of an abnormal detection means, and does not correct the deficiencies of Hirst et al.

For the reasons discussed above, independent Claims 13, 26 and 32 patentably define over the cited references. Moreover, as Claims 14-25, 27-31 and 33-37 depend from Claims 13, 26 and 32 respectively, these claims also patentably define over the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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